Privacy and Data Security Forum: High Tech and Innovation Conference

IoT Behind the Curtain: A Look at the Technology

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First Wave IoT: Convergence of Old Products with New Communications Technology
History of Vehicle Automation

1956: Car Phones
1965: Cruise Control
1996: Vehicle Communications
2007: Infotainment
2020?: Autonomous Cars
Vehicular Event Data Recorders (EDR)

1. Required in new vehicles since 2012 CFR 563
2. 15 Types of Data Recorded (last 5 sec)
   - Vehicle Speed
   - Engine Speed
   - Throttle
   - Brake Status
   - Drivers’ seat belt (on/off)
   - Passenger air bag enabled
   - Steering Angle
   - Change in Velocity
3. Accident reconstruction, liability
4. Cellular transmission to manufacturer
5. Who owns the EDR data?
Owner of a Tesla Model X SUV claimed vehicle suddenly accelerated on its own and crashed into a building.

Tesla is constantly connected with its vehicles over the internet. Tesla consulted its event logs and published statement:

"Data shows that the vehicle was traveling at 6 mph when the accelerator pedal was abruptly increased to 100 percent ... Consistent with the driver’s actions, the vehicle applied torque and accelerated as instructed."
Vehicular Collision Management

Alert family

Alert authorities

Vehicular Collision Management

Signal Light
Reroute traffic
Injured Occupant Management

1. Alert contacts
2. Detect nonresponsive occupants
3. Dispatch ambulance
4. Provide medical records
5. Activate medical specialists
### Classes of IoT Applications

<table>
<thead>
<tr>
<th>Category</th>
<th>IoT Applications</th>
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<tbody>
<tr>
<td>Electrical Distribution</td>
<td>Assembly</td>
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<tr>
<td>Home Appliances</td>
<td>Healthcare</td>
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<td>Predictive Maintenance</td>
<td>Pollution Control</td>
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<tr>
<td>Asset Tracking</td>
<td>Security</td>
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<td>Automated Farming</td>
<td>Weather Tracking</td>
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<tr>
<td>Automated Manufacturing</td>
<td>Remote Monitoring</td>
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<tr>
<td>Telecommunications</td>
<td>Home Automation</td>
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<tr>
<td>Hazardous Environments</td>
<td>Wearables</td>
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<tr>
<td>Military</td>
<td>Financial Transactions</td>
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<tr>
<td>Sports</td>
<td>Consumer Analysis</td>
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<tr>
<td>Energy Efficiency</td>
<td>Safety</td>
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<tr>
<td>Research</td>
<td>Telemedicine</td>
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<tr>
<td>Entertainment</td>
<td>Law Enforcement</td>
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IoT Architecture
IoT Architecture

Communications

Sensors

Actuators
## IoT Automotive Components

<table>
<thead>
<tr>
<th>Sensors</th>
<th>Actuators</th>
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<tbody>
<tr>
<td>Security System: theft</td>
<td>Police: dispatch</td>
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<tr>
<td>Thermostat: fire detection</td>
<td>Fire Dept: dispatch</td>
</tr>
<tr>
<td>Accelerometers: collision detection</td>
<td>Wrecker Service: dispatch</td>
</tr>
<tr>
<td>GPS: location</td>
<td>Emergency Service Directions</td>
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<tr>
<td>Fuel: volume &amp; rate of consumption</td>
<td>Gas Station: price adjustment</td>
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<tr>
<td>In-Road Sensors: vehicle weight</td>
<td>Toll Collection: price adjustment</td>
</tr>
<tr>
<td>RFID: vehicle identification</td>
<td>Barricades: parking access control</td>
</tr>
</tbody>
</table>
1. LAN
2. Bluetooth
3. ZigBee
4. Wi-Fi
5. Cellular
U.S. Dept. Transportation: Standards for Autos

Representative ITS connections, standards and applications.
Source: http://www.its.dot.gov/standards_strategic_plan/
Exponential Growth
Exponential Growth in Number of Devices
(Est. 30 Billion Devices)
Exponential Growth in Network Connectivity

2000

2010

2020

2030
Technical Complexity Requires Standardization
1. Members jointly develop technical standards for interoperability among multiple suppliers
1. Standards assure interoperability

2. Obligation to license on “Fair, Reasonable, And Non-Discriminatory” basis

3. Cellular industry—prime example of successful interoperability based on FRAND licensing
Front Line IoT Legal Issues
IoT Issues for Contract Reviews: Data

1. Who authorizes collection of data?
2. Knowing consent of data providers?
3. Who/what/when/where is data collected?
4. Where is data stored?
5. Who has access?
6. How may data be used?
7. Reps & warranties
8. Limitations on damages
International Data Flow Issues

1. USA vs EU privacy standards
2. Foreign, national, state, and local taxes
3. Compliance with multiple, complex regulations
4. Cyber security
Shifting Risks to Others in Uncertain Times

1. Business vehicles: 3rd party providers assume risk?
2. Personnel data: 3rd party HR administrators?
3. Health care: 3rd party HIPPA admin to absorb cost?
4. Customer financial records: 3rd party IT security?
Preparing for IoT Legal Issues

1. Designate an in-house IoT expert
2. Project proposals need IoT risk analysis
3. Update HR policies
4. Compliance audits for financial, IT, legal, and HR
5. Identify outside counsel in advance
Convergent Technologies Spawn IP Conflicts
IP Litigation in U.S. District Courts

- 2,540 cases (43.7%) E.D. Tex.
- 2,437 cases (41.9%) Other districts
- 545 cases (9.4%) C.D. Cal.
- 297 cases (5.1%) D. Del.
U.S. International Trade Commission
Technology at Issue in ITC Cases

Accused Products in CY 2011 and 2012

- Pharmaceuticals and medical devices: 6%
- Printing products: 1%
- Small consumer items: 9%
- Automotive/Manufacturing/Transportation: 4%
- Chemical compositions: 2%
- Computer & telecommunications products: 27%
- Consumer electronics products: 16%
- Integrated circuits: 8%
- LCD/TV: 11%
- Memory products: 2%
- Lighting products: 5%
- Other: 9%
Three Elements of § 337 Violations at ITC

§ 337 (B): Infringement of intellectual property rights

Products can be excluded from the U.S. if:

1. The products infringe a valid U.S. IP right, and

2. The products are imported, and

3. A U.S. domestic industry is using the IP rights
Fast Proceedings: Trial in 10 Months

- Final Decision/Orders
- Commission Review
- ALJ Deliberations
- Post-Trial
- Trial
- Pre-Trial
- Discovery
- Institution

Months: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16